

EXHIBIT 31

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UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF CALIFORNIA
SAN JOSE DIVISION

IN RE SEAGATE TECHNOLOGY LLC
LITIGATION,

CASE NO. 5:16-CV-00523-JCS

CONSOLIDATED ACTION,

VIDEOTAPED DEPOSITION OF JOSHUAH ENDERS

San Francisco, California

Wednesday, June 7, 2017

Reported by: Ashley Soevyn, CSR No. 12019

Job No. 2228

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<p style="text-align: right;">Page 106</p> <p>1 A We, as in the industry.</p> <p>2 Yeah. I might have looked into that.</p> <p>3 That may have been related to Seagate acutrac off of</p> <p>4 that --</p> <p>5 Q Where are you referring to that?</p> <p>6 A Here, on the second page, under the large</p> <p>7 4K. It says: Maximize hard drive storage density.</p> <p>8 Barracuda one terabyte per disc technology</p> <p>9 incorporates 34 -- 340,000 unique tracks the width</p> <p>10 of a single inch. So that's referring to</p> <p>11 perpendicular recording technology, where the</p> <p>12 drive-head, instead of writing data in tracks on the</p> <p>13 disk, it writes them vertically somehow. I'm not</p> <p>14 really sure how it works.</p> <p>15 Q Is that what you're referring here in</p> <p>16 paragraph 227, where you say: He read defendant's</p> <p>17 statements contained therein, i.e. the information</p> <p>18 on the 2012 Barracuda web page on the Barracuda data</p> <p>19 sheet.</p> <p>20 A So can you -- page 38 of Exhibit 4?</p> <p>21 Q Yes. I'm sorry. I'm referring back to</p> <p>22 paragraph 227.</p> <p>23 A I have a lot of documents in front of me</p> <p>24 right now.</p> <p>25 Q If you can, try to keep that page open.</p>	<p style="text-align: right;">Page 108</p> <p>1 Q I thought we were referring to under best</p> <p>2 fit applications.</p> <p>3 A Yeah. Sorry. I skipped around.</p> <p>4 So under best fit applications desktop</p> <p>5 raid network attached storage devices. Network</p> <p>6 attached storage devices, that was my application.</p> <p>7 That's what I was building.</p> <p>8 Q So you recall reviewing that in 2012?</p> <p>9 A Absolutely.</p> <p>10 Q Anything else?</p> <p>11 A So under best fit applications, desktop</p> <p>12 raid and then under key advantages, the Seagate</p> <p>13 Smart Align and the acutrac server technology.</p> <p>14 Q So there's -- four bullets down on</p> <p>15 Exhibit B, it refers to Seagate acutrac server</p> <p>16 technology delivers dependable performance even with</p> <p>17 hard drive track widths of only 75 nanometers.</p> <p>18 Is that what you're referring to?</p> <p>19 A That's right.</p> <p>20 Q Then two bullets beyond that: Seagate's</p> <p>21 Smart Align technology provides a simple,</p> <p>22 transparent migration to advanced format 4K sectors?</p> <p>23 A That's right.</p> <p>24 Q Anything beyond those four that you</p> <p>25 specifically recall reviewing?</p>
<p style="text-align: right;">Page 107</p> <p>1 A Okay.</p> <p>2 Q So I'm referring to paragraph 227 where</p> <p>3 you say you reviewed the 2012 Barracuda web page and</p> <p>4 the Barracuda data sheet. And then you say: He</p> <p>5 read defendant's statements contained therein,</p> <p>6 particularly those pertaining to the benefits of</p> <p>7 acutrac technology.</p> <p>8 I believe that's what we were just</p> <p>9 discussing, acutrac technology. That was one of the</p> <p>10 things that you recall reviewing at the time?</p> <p>11 A That's right. And I mean, very</p> <p>12 specifically -- I mean, I pained over this decision</p> <p>13 because it was a big capital expenditure. And one</p> <p>14 piece that I kept on -- I kind of was toggling back</p> <p>15 and forth at the time between this and, probably,</p> <p>16 the -- maybe the Western Digital greens. I think,</p> <p>17 yeah, I was priced out of the reds. I think that</p> <p>18 the --</p> <p>19 Anyway, the specific -- the specific kind</p> <p>20 of seller was -- Exhibit B was -- the best fit</p> <p>21 applications on the first page with the logos on it.</p> <p>22 Page 23 of Exhibit B.</p> <p>23 And so Seagate Smart Align technology</p> <p>24 provides a simple transparent migration to advanced</p> <p>25 4K sectors. That was very relevant.</p>	<p style="text-align: right;">Page 109</p> <p>1 A No. On the other side of the page --</p> <p>2 obviously, I referenced these technical</p> <p>3 specifications, and all of these things have meaning</p> <p>4 to me.</p> <p>5 Q Okay. So now we're looking at Exhibit B</p> <p>6 to Exhibit 4, that's document 62-2 in the court</p> <p>7 filing system, page three of three. The Barracuda</p> <p>8 specs. Is that what you would call them?</p> <p>9 A Yes.</p> <p>10 Q And you recall reviewing that on</p> <p>11 Seagate's website in August 2012?</p> <p>12 A This format may have been either abridged</p> <p>13 and had only key elements of this table that I'm</p> <p>14 looking at here. The PDF may have been supplied on</p> <p>15 that third tab of the product page, but the key</p> <p>16 elements are here.</p> <p>17 Q The product page, meaning what we just</p> <p>18 reviewed on Exhibit 6?</p> <p>19 A That's correct.</p> <p>20 Q So what specific specs did you consider</p> <p>21 and rely on?</p> <p>22 A Spindles. Well, we're going to go down</p> <p>23 the list, ready?</p> <p>24 THE REPORTER: Slowly.</p> <p>25 THE WITNESS: Interface options, spindle</p>

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<p style="text-align: right;">Page 110</p> <p>1 speed, cache, seek average -- read and seek average, 2 write, average data rate, max sustained data rate, 3 bytes per sector, load and unload cycles, 4 non-recoverable read errors per bits read max. 5 That one is very important. 6 BY MS. MCLEAN: 7 Q Why is it very important? 8 A That's basically how reliable the write 9 head is across the platter. And so that's a -- it's 10 a big indicator of good engineering and long-term, 11 you know, availability, I guess. 12 The annualized failure rate, power-on 13 hours. 14 That's another big one. 15 Q What is significant about the power-on 16 hours? 17 A That's number of hours of continuous 18 operation, I believe. 19 Q Did you use the drives in accordance with 20 the recommended power-on hours? 21 A Yes. But they didn't last that long. 22 Q How many hours per week is 2,400 hours, 23 on a yearly basis? 24 A I can't do the math. 25 Q What did you have in mind when you were</p>	<p style="text-align: right;">Page 112</p> <p>1 intended to have the drives operating in? 2 A Yeah. 3 Q Do you have a cooling system in place? 4 A I do. 5 Q What kind of system is it? 6 A It's passive intake active exhaust. So I 7 have a 350 cubic foot a minute centrifugal fan that 8 exhausts in closed -- in a hot air containment 9 system, to a window, to the outside air. And I have 10 a HEPA filter on the outside air that is passively 11 pulled in. 12 Q What is that? 13 A It's a filter that is used for filtering 14 particulates below a certain nanometer size, like 15 bacteria and pollen and dust that you can't get into 16 a computer. 17 Q Do you keep the window open all the time? 18 A The window is sealed with the HEPA filter 19 so the only way that the air gets in is through the 20 HEPA filter, so the window is, by nature, open 21 always. Yes. 22 Q Through the filter? 23 A That's right. 24 Q Anything else, while we're on the data 25 sheet, that you considered at the time?</p>
<p style="text-align: right;">Page 111</p> <p>1 considering that? 2 A 24/7 operation. 3 Q 24/7? 4 A That's right. 5 Q Anything else? 6 A The idle average power. That was very 7 relevant. 8 The operating power or -- sorry, 9 operating mode. This was all under the power 10 management section. This is how much power the 11 drive draws, and that gives you the ability to 12 estimate your power bill and then also your power 13 requirements for the power supply in the computer, 14 and the efficiency of that. 15 Temperature. 16 And -- 17 Q What did you consider with regard to 18 temperature? 19 A Well, in the Google white paper, with a 20 large population of drives, they didn't find a 21 unique relation between temperature and annualized 22 failure rate. So it wasn't a huge concern of mine 23 before I purchased the drives. But somewhere 24 between 40 and 60 degrees Celsius. 25 Q That's where what temperature you</p>	<p style="text-align: right;">Page 113</p> <p>1 A Acutrac and its Smart Align technology, 2 those are the marketing terms for the practices 3 behind them. So those two. 4 Q So, to the best of your recollection, the 5 items that you just listed were factors in your 6 consideration of purchasing the Seagate SD3000DM001? 7 A That's correct. 8 Q So, other than the 2012 Barracuda web 9 page and the Barracuda data sheet, did you read any 10 other materials in connection with your purchase of 11 the SD3000DM001? 12 A I'm sure I read, you know, every 13 available review at the time, either on Tom's 14 Hardware or, you know, other sites. 15 Q What other sites? 16 A I don't have those ones memorized. 17 Q Are there some that you generally go to 18 in making purchase decisions? 19 A Sure. AnandTech. 20 Q A-N-A-N-D? 21 A Yup. AnandTech. I can't recall any 22 other names. 23 Q You also mentioned a Google white paper, 24 was that also a factor in your decision? 25 A Yeah.</p>

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<p style="text-align: right;">Page 126</p> <p>1 BY MS. MCLEAN:</p> <p>2 Q So other than the factors that we have</p> <p>3 just reviewed on Exhibit B, were there any other</p> <p>4 statements and data you believe were misrepresented</p> <p>5 in Seagate's statement referred to in paragraph 230</p> <p>6 in the complaint?</p> <p>7 MR. SIEGEL: Objection as to form.</p> <p>8 BY MS. MCLEAN:</p> <p>9 Q I'll rephrase that.</p> <p>10 A Thank you.</p> <p>11 Q Earlier, we talked about the AFR. You</p> <p>12 believed that was a misrepresentation.</p> <p>13 A Yes.</p> <p>14 Q Are there any other statements that you</p> <p>15 believed -- you considered, in connection with the</p> <p>16 purchase of your hard drives that you believe were</p> <p>17 misrepresented?</p> <p>18 A Yes. So I mean under the -- on Exhibit</p> <p>19 B, on the second page, the power-on hours, none of</p> <p>20 my drives, including replacement drives, ever</p> <p>21 achieved 2,400 power-on hours.</p> <p>22 The non-recoverable read errors per bits</p> <p>23 read, so a system of a drive's failing were</p> <p>24 uncorrectable read errors as exposed by the drive</p> <p>25 firmware and the Linux kernel. And my experiences</p>	<p style="text-align: right;">Page 128</p> <p>1 rate, I was losing a drive a week, a drive a month</p> <p>2 of these Seagate drives, in my very ideal conditions</p> <p>3 in my home NAS with -- you know, sitting mostly</p> <p>4 idle.</p> <p>5 Q How did you calculate how many power-on</p> <p>6 hours that you used?</p> <p>7 A So the drive firmware has something</p> <p>8 called Smart Self Monitoring and Reporting</p> <p>9 Technology. And that is embedded in the drive</p> <p>10 firmware, and it's exposed via a tool called HDParm.</p> <p>11 And so I would have used the HDParm tool, with a</p> <p>12 capital I flag, to read the data out of the firmware</p> <p>13 and get a sense that, yeah, the power-on hours, in</p> <p>14 addition to some of these other, you know,</p> <p>15 diagnostics that are listed in Exhibit B.</p> <p>16 Q Do you have records of those -- that</p> <p>17 smart data?</p> <p>18 A I might.</p> <p>19 Q Where would they be?</p> <p>20 A They might be in a backup.</p> <p>21 Q That might be something that we ask you</p> <p>22 for.</p> <p>23 So we talked about the AFR, we talked</p> <p>24 about power-on hours, we talked about</p> <p>25 non-recoverable read errors per bit. Any other</p>
<p style="text-align: right;">Page 127</p> <p>1 were that those were a little outside of the typical</p> <p>2 range, and those were symptoms of a drive that was</p> <p>3 failing.</p> <p>4 Q What do you mean by a little outside of</p> <p>5 the typical range?</p> <p>6 A It's very typical for uncorrectable</p> <p>7 readers kind of in general. So, in my professional</p> <p>8 life, when working at you know, Six Apart or Zoosk,</p> <p>9 it was -- or at Cloudflare, but mostly Six Apart and</p> <p>10 Zoosk, I dealt with spinning disks in 24/7</p> <p>11 operation, in data centers, where they were under</p> <p>12 immense workloads of serving production traffic and</p> <p>13 high op scenarios. So, basically, they were just</p> <p>14 constantly seeking. And we would have drives last,</p> <p>15 you know, three, four plus years; usually four or</p> <p>16 five years, maybe. But it wasn't a constant -- it</p> <p>17 wasn't a constant issue.</p> <p>18 So out of, let's say, 300 kilowatts of</p> <p>19 machines, that's 48 divided by 4 times 16 machines,</p> <p>20 times 24 drives, you would -- we would probably</p> <p>21 replace one every three weeks out of all those</p> <p>22 drives. And the symptom was similar, where you see</p> <p>23 uncorrectable read errors, as reported by the Linux</p> <p>24 kernel, as exposed by the drive's firmware.</p> <p>25 And, yes, this was extraordinary. At any</p>	<p style="text-align: right;">Page 129</p> <p>1 statements you believe were misrepresentations?</p> <p>2 MR. SIEGEL: Are you specifically talking</p> <p>3 about statements in Exhibit B?</p> <p>4 MS. MCLEAN: No. I'm speaking about</p> <p>5 paragraph 230, where you refer to the statements</p> <p>6 that were misrepresentations.</p> <p>7 THE WITNESS: I see.</p> <p>8 The load and unload cycles. The, yeah,</p> <p>9 load and unload cycles.</p> <p>10 BY MS. MCLEAN:</p> <p>11 Q 300,000?</p> <p>12 A That's right.</p> <p>13 Q How was that wrong?</p> <p>14 A So that's a counter, as I understand,</p> <p>15 that's incremented when the -- basically, the read</p> <p>16 head of drive, it's a moving part, it parks and</p> <p>17 un parks. And I didn't get anywhere near 300,000. I</p> <p>18 can't speculate on what I got. I don't remember.</p> <p>19 But it was off by several orders of magnitude,</p> <p>20 several orders of magnitude, before the drives</p> <p>21 failed.</p> <p>22 Q Anything else you were referring to in</p> <p>23 paragraph 230?</p> <p>24 MR. SIEGEL: Objection as to form.</p> <p>25 THE WITNESS: Anything else? Could you</p>

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<p>1 record. Thank you.</p> <p>2</p> <p>3 (TIME NOTED: 7:20 p.m.)</p> <p>4</p> <p>5</p> <p>6</p> <p>7</p> <p>8</p> <p>9</p> <p>10</p> <p>11</p> <p>12</p> <p>13</p> <p>14</p> <p>15</p> <p>16</p> <p>17</p> <p>18</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p>	<p style="text-align: right;">Page 270</p> <p>1 I, the undersigned, a Certified Shorthand</p> <p>2 Reporter of the State of California, do hereby</p> <p>3 certify:</p> <p>4 That the foregoing proceedings were taken</p> <p>5 before me at the time and place herein set forth;</p> <p>6 that any witnesses in the foregoing proceedings,</p> <p>7 prior to testifying, were duly sworn; that a record</p> <p>8 of the proceedings was made by me using machine</p> <p>9 shorthand, which was thereafter transcribed under my</p> <p>10 direction; further, that the foregoing is a true</p> <p>11 record of the testimony given.</p> <p>12 I further certify I am neither financially</p> <p>13 interested in the action nor a relative or employee</p> <p>14 of any attorney or party to this action.</p> <p>15 IN WITNESS WHEREOF, I have this date</p> <p>16 subscribed my name.</p> <p>17</p> <p>18 Dated: _____</p> <p>19</p> <p>20</p> <p>21 <u>Ashley Soevyn</u></p> <p>22 ASHLEY SOEVYN</p> <p>23 CSR No. 12019</p> <p>24</p> <p>25</p>
<p>1 I, JOSHUAH ENDERS, do hereby declare under</p> <p>2 penalty of perjury that I have read the foregoing</p> <p>3 transcript; that I have made any corrections as</p> <p>4 appear noted, in ink, initialed by me, or attached</p> <p>5 hereto; that my testimony as contained herein, as</p> <p>6 corrected, is true and correct.</p> <p>7 EXECUTED this _____ day</p> <p>8 of _____,</p> <p>9 20____, at _____, _____.</p> <p style="text-align: center;">(City) (State)</p> <p>10</p> <p>11</p> <p>12</p> <p>13 _____</p> <p>14 JOSHUAH ENDERS</p> <p>15</p> <p>16</p> <p>17</p> <p>18</p> <p>19</p> <p>20</p> <p>21</p> <p>22</p> <p>23</p> <p>24</p> <p>25</p>	<p style="text-align: right;">Page 272</p>